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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,167	10/12/2001	Frederick Paul Benning	ROC920010111US1	1982

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EXAMINER

AHMED, SHAMIM

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 02/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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## Office Action Summary

Application No.

09/976,167

Applicant(s)

BENNING ET AL.

Examiner

Shamim Ahmed

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18,35 and 36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18,35 and 36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, filed 1/18/05, with respect to Labib et al as to the point that there is no motivation to combine the teaching of adding a surfactant into a polishing composition of Hartog et al, wherein the surfactant is used in a mixed-phase cleaning composition for removing contaminants, biofilms, debris and the arguments have been fully considered and are persuasive.

Therefore, the finality of the last Office action is withdrawn.

### ***Claim Objections***

2. Claims 11-12 are objected to because of the following informalities: The claims should mention that the metal etchant is the claimed metal ions not the metal itself as the specification (page 19, lines 5-7) discusses that the metal etchant comprises Zr,Ti, Sn,----- Ni, Mn and Zn ions.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1,4-10,13-18 and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al (US 2003/0079416 A1).

Ma et al disclose a polishing composition comprising carrying fluid such as acids, colloidal particles, ferric nitrate, which resemble as the metal etchant and a surfactant of cationic or anionic (paragraphs 0047-0051, paragraphs 0053 and 0059-0061).

Ma et al disclose that the surfactants causes steric repulsion among the particles (paragraph 0060) but do not explicitly teach that the surfactants causes steric hindrance barrier between the substrate and the particles.

However, Ma et al teach that the abrasive particles may comprise silica, alumina, ceria and mixture thereof (paragraph 0068) and hence the surfactants causes steric repulsion among the particles (paragraph 0060).

Ma et al also teach that the composition is use to polish metal, barrier layer and dielectric material such as silicon oxide (abstract and paragraph 0033).

Therefore, it would have been obvious to form similar steric repulsion or steric hindrance between the substrate and the particles because the substrate comprises dielectric material such as silicon oxide as taught by Ma et al.

As to claims 4-8, Ma et al teach that the pH of the polishing composition is in the range of 2 to about 4.8 (paragraph 0050) and preferably in the pH range of 4-10 (paragraph 0069).

As to claims 9-10 and 36, Ma et al teach that the nominal particle size is in the range of about 3 to 100 nm (paragraphs 0047 and 0070-0071).

As to claims 13-18, Ma et al broadly teach the surfactants may be cationic or anionic (paragraph 0060 at page 5).

6. Claims 1-6, 8-18 and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartog et al (6,236,542) in view of Kramer et al (6,630,403).

As to claims 1,11-12 and 35, Hartog et al disclose a cleaning polish etch composition comprises a carrying fluid such acid, neutral or base solution and metal etchant such as aluminum nitrate or cerium sulfate or any other etchant depending on the substrate for etching the substrate and/or the attached slurry particles (col.4, lines 19-28, col.5, lines 60-col.6, lines 17).

Hartog et al fail to teach the composition comprises a surfactant that forms a steric hindrance barrier between the substrate and the colloidal particles.

However, Kramer et al disclose a polishing composition including silica abrasive and surfactant, wherein the surfactant forming particle barrier layer or flow modifiers to reduce roughening on the polished surface in order to reduce scratches and eventually cracking on the polished surface and the reduction of cracking decreases access of

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cleaning chemistry to underlying structures of the substrate (col.2, lines 1-5 and lines 53-67 and col.3, lines 13-21 and col.4, line 66-col.5, line 12 and col.6, lines 55-67).

Kramer et al do not explicitly teach that the surfactants form a steric hindrance barrier between the substrate and the colloidal particles but disclose that the surfactants are similar as the instant invention such cationic surfactants are derived from amine salt (col.5, lines 5-11) and expected to have similar effect.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Kramer et al's teaching of introducing a surfactant into Hartog et al's composition for reducing scratches and cracks on the surface during polishing as taught by Kramer et al.

As to claims 2-3, Hartog et al teach that the substrate is a silicate based glass disk (col.4, lines 12-25).

As to claims 4-6, Hartog et al teach that the colloidal particles are silica based and pH of the composition could be about 1.0 (col.7, lines 8-13).

As to claim 8, Hartog et al teach that the pH of the composition could be above 3.0, which reads on claimed pH 3.5 (col.5, line s40-43).

As to claims 9-10, Hartog et al teach that the colloidal particles have a size in the range of 0.001-1  $\mu\text{m}$  (1-1000nm) (col.6, lines 25-29).

As to claim 36, Hartog et al teach that the colloidal particles have a size in the range of 0.001-1  $\mu\text{m}$  (1-1000nm) (col.6, lines 25-29).

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7. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartog et al (6,236,542) in view of Kramer et al (6,630,403) and further in view of Small et al (6,251,150).

Modified Hartog et al discussed above in the paragraph 6 but fail to explicitly teach that the composition comprises colloidal alumina having a pH of about 3.5-10.5 (claim 8) or a pH of about 7-12 (claim 7).

However, Small et al (6,251,150) disclose a composition comprises colloidal particles of silica or alumina (aluminum oxide) having a pH of about 3.8-9.4 for maintaining the zeta potential of the slurry composition in order clean or remove the residue efficiently (col.10, lines 8-15, col.10, lines 48-51 and col.11, lines 4-7).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Small et al's teaching into modified Hartog et al's composition for efficient removal of particles or residue as taught by Small et al.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Miyashita et al (5,968,239) and Luo et al (6,676,718) disclose a polishing slurry including particles and surfactants in which surfactants are used to improve the dispersibility of polishing particles.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (571) 272-1457. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Shamim Ahmed  
Examiner  
Art Unit 1765

SA  
February 3, 2005